

Full Length Research Paper

Impact of using telemedicine on knowledge management in healthcare organizations: A case study

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Accepted 1 December, 2011

This paper describes how telemedicine technology affects knowledge management generally and knowledge sharing process specifically. This issue may be important in health sectors and knowledge oriented organizations which are eager to improve knowledge sharing in their organizations. Using telemedicine and e-health technologies, healthcare organizations can deliver healthcare to patients in a distance, so that an improvement in their productivity, effectiveness and efficiency can be reached. Although, there is a huge potential in knowledge sharing issues using telemedicine, most current researches focus on the economic benefits of using telemedicine. In this paper, a new framework is developed in the knowledge sharing area, based on some theoretical and conceptual issues that depict knowledge management benefits. Also, a model is developed to explain how knowledge sharing occurs in telemedical practices. Finally, there is a discussion of the potential benefit of knowledge sharing using telemedicine. Here, findings in a healthcare organization are examined and results show that telemedicine has different effects on knowledge sharing, idea sharing, productivity, knowledge oriented culture and quality service in distance areas.

Key words: Telemedicine, knowledge management, organizational learning, healthcare organization, e-health.

INTRODUCTION

Telemedicine transfers healthcare via telecommunication and information technology infrastructure to patients in distant areas from hospitals or clinical centers. Telemedicine is advocated for its potential to improve accessibility and availability of healthcare with lower costs (Charles, 2000). One point that might be important in this case is that the healthcare organizations are knowledge oriented organizations and most of the services that provided by these organizations, are operated by the human knowledge. In this paper, it was illustrated that information technology helps in knowledge management, and also in medical sciences to manage inter-disciplines such as telemedicine and telehealth. In these technologies, healthcare services are delivered by specialists in a situation where the location is the key factor; by using information technology and

communication, they can gather some information about a patient's diagnosis by specialists. This way, knowledge sharing occurs from sub-specialist to specialist, specialist to medical doctor, nurse and technician. The view presented in this paper is important because the knowledge can promote organizational properties and the organization's capital in cases where telemedical projects are not considered sufficiently.

Information technology fosters collaborations among multiple specialists in several locations via telecommunication, and also provides foundations for organizational learning and knowledge sharing. This is a response to the needs of the healthcare industry. This paper is therefore intended to present a framework for healthcare organizations where considering knowledge extraction and recording new technologies such as telemedicine is possible. To support this suggestion, emphasis on literature review in several disciplines is necessary, because this technology is an inter-disciplinary issue.

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LITERATURE REVIEW

Telemedicine

For over half a century, telemedicine has been presented to the healthcare industry and has affected the industry, especially operational oriented organizations such as the U.S. military and National Aeronautics and Space Administration (NASA) in the 1950s. The rapid development of information technology, telecommunication technologies and also healthcare technologies is a revolution in the healthcare services delivery (Huston et al., 2000). This revolution provides solutions for healthcare service delivery, especially in the accessibility and availability of healthcare in distant and rural areas. In operational organizations that operate in distant areas from healthcare centers, escalating cost of delivery can be seen. Telemedicine is an innovation that creates a paradigm in the healthcare delivery and human resources culture (Bashshur et al., 2000). As mentioned in the introduction, most of the articles on telemedicine focus on the technical issues and economic benefits of using telemedicine; there are not many articles about the knowledge management benefit of this innovated phenomenon. To emphasize the managerial benefits, especially in knowledge management, medical knowledge was transferred to lower grades of healthcare delivery network in emergency situations. However, as mentioned in the technological approach, attention should be paid to variables such as technological acceptance, information technology capability, level of development and also organizational knowledge of technologies, especially information technology.

The idea of telemedicine has been conceptualized. The most frequently used definition of telemedicine in literature is "the use of electronic information and communication technologies to provide and support healthcare when distance separates the participants" (Field, 1996). The Britain society of telemedicine defines telemedicine as providing healthcare by specialists, where distance is a significant factor by using information technology that provides a condition for diagnosis, treatment, preventive activities, and also research by using neo-technologies in healthcare services for providing health for individuals. Also, the American society of telemedicine defines telemedicine as transferring medical information from one point to another via electronic communication for providing better health for patients. The World Health Organization (WHO) defines telemedicine as "using information technology to provide accessibility and availability of healthcare from one point to another point".

By linking healthcare delivery units and healthcare network levels including healthcare professionals, hospitals researchers, institutions, nurses and technicians for effective collaboration, and by providing accessibility for updated information or knowledge, we

can see the quality and quantity of service delivery to patients.

Telemedicine has many benefits, especially in knowledge sharing for physicians and healthcare employees. Some of these benefits are relevant for reducing travel time, especially in operational areas and for increasing the accessibility of healthcare services or medical facilities of a hospital as well as saving potential cost. Another benefit of using telemedicine services is increasing the quality of services in rural areas and areas distant from central healthcare facilities, and also providing facilities and opportunities for the education of staff through telemedical system report, an enhancement in clinical care (Michael et al., 2003).

Another study shows that the general perception of healthcare quality in a community is much higher when telemedical services are available (Nesbitt et al., 2005). Distant areas are also able to take advantage of qualified physicians with knowledge sharing through telemedical systems when telemedicine is implemented in health network layers that have access to top specialists located in metropolitan facilities.

Telemedical essentials

Distance

From an economic perspective, the implementation of telemedicine is possible when the point is far from special and sub-special centers and facilities such as hospitals. This distance may cause problems of inaccessibility to medical and healthcare services for patients and also healthcare staff. This can happen between states, cities or countries. Providing healthcare services and also health experts in distant areas might be difficult and sometimes in a limited time, may be impossible.

Information communication technology

Information communication technology infrastructure is fundamental to telemedical technology; it is equally essential for the implementation of telemedicine, and must be realistic and stable. This is because medical information, consultations, equipment, data and information as well as knowledge of specialists flow to lower grade staff through the infrastructure. A number of "High-techs" that may be useful in telemedical structure are as following:

- (i) Communication (telephone line, ISDN, E1, etc.)
- (ii) Communication through mobile facilities
- (iii) Internet connection
- (iv) Fiber optic network
- (v) Satellite network, etc.

Medical equipment

All equipment should have facilities to connect network and support information technology protocols. These days almost all medical equipment have these essential factors and can support physician's visits and diagnostic process and also transfer this information to another place or point in the world. Some of these equipment are:

- (1) Tele-stethoscope (support TCP/IP)
- (2) Tele-ECG (12 channels that support TCP/IP)
- (3) Tele-biologic diagnosis equipment (Glucometer)
- (4) Tele-otoscope
- (5) Tele-radiology
- (6) Visit cameras
- (7) Videoconference facilities
- (8) Tele-sonography
- (9) Tele-surgery
- (10) Tele-spirograph, etc.

Patient and medical team

In both sides of telemedical communication network participated by patient and medical team in developed systems, it is possible that patient does the consultation of the medical team himself. In some healthcare networks, the telemedical system includes several levels of referral networks that are used by healthcare organizations, especially in governmental organizations such as national health system.

Telemedicine types**Real time telemedicine**

In this method the communication between patient and medical teams occurs in real time, and the information and medical procedures are transferred in real time. In this model some medical equipment should be used that have ability to connect to network and transfer information to the medical team. This is the exact time that the medical team can transfer orders and procedures to the patient. One of the most important equipment that should be operated in real time is the tele-surgery equipment that the medical and surgical team control and command. In real time situation, the system is operated by a robot that acts as a surgeon's hand.

Store and forward (asynchronous)

This system is useful when transferring information is not limited in time and it is not necessary to use real time model. In this model, the medical team has sufficient time to analyze the patient's information and make decision

about treatment procedures. This style can be used in medical committees. Ideally, within networks, specialty healthcare services can be delivered from medical team to patients as needed, regardless of the distance or location. As a result of development and utilization of telemedical system, an ongoing visual networking revolution has the potential to transform the distant areas healthcare system through increased integration and assimilation of healthcare professionals and organizations into systems and networks (Moscovice et al., 1997).

Electronic healthcare organizations network is replacing traditional healthcare services delivery to serving as the focus of healthcare delivery in the world, especially in rural and distant areas. This is a solution for operational organizations in some industries, such as petroleum industry. Healthcare organizations can provide special and sub-special healthcare services to oil and gas fields and operational staff receive these kinds of services in real time process.

In view of the foregoing, telemedicine can be defined as an integrated and collaborative system that uses network infrastructure for the delivery healthcare services (Hamel, 1991). There is a relationship between this technology, knowledge sharing and organizational learning, so reviewing some literature on knowledge management and organizational learning that applies theoretical approach to examine how telemedicine can most effectively be developed and utilized for knowledge sharing is inevitable. As mentioned before, the healthcare industry is a knowledge oriented industry that is characterized by exponentially expanding knowledge based activities, in order to decrease uncertainty, compress time and serve with lower costs (Bashshur et al., 2000). Knowledge sharing is a principle of knowledge creation, discovery, and acquisition in which transferring and sharing are significant.

ORGANIZATIONAL LEARNING

The organizational learning literature emphasizes on different dimensions of organizational learning, but this paper defines organizational learning in terms of acquiring existing knowledge from external sources and integrating it into organizational knowledge (Huber, 1991). This source can be in contrast to learning knowledge creation, developing and discovering new knowledge (Nonaka and Takeuchi, 1995). There are two types of organizational learning: single and double loop learning; the differentiation between these two is very important.

Single loop organizational learning is based on motivation response mechanisms. This set of mechanism is generated by a process of action reflections. Changing the actions and strategies will result achieving a desired result. Single loop organizational learning (SLOL) focuses

on solving current problems without testing current learning behaviors (Senge, 1990).

Double loop organizational learning (DLOL) by way of definition has a special focus on continued experimentation and feedback in ongoing examination and problem solving (Romme and Witteloostuijn, 1999). DLOL involves reengineering learning processes to see a new concept (Argyris, 1992). This comprises reflection and change of goals, objectives, strategies and operating rules as well as governing actions. DLOL is particularly difficult because people tend to build defensive behavior (Amit and Schoemaker, 1993). However, it is clear that knowledge oriented organizations such as healthcare organization should use both SLOL and DLOL for knowledge creation.

Organizational learning is also has a process that flows during activities undertaken in conditions of uncertainty (Nonaka, 1994). It requires social interaction for continuous conversion of knowledge in the organizations (Johnson, et al., 1981). Additionally, this interaction must have certain qualities for learning to be effective in healthcare organizations. Organizational learning will be easier and more effective when organizational units and individuals engage in knowledge sharing culture (Powell, 1992). When learning occurs in a given interaction, knowledge transfer interchanges across healthcare organization layers because effective organizational learning occurs during rich knowledge source, among organizational units with different specialties and different types of experiences and education.

Learning is easier and faster when the organization uses a technology that facilitates organizational communication such as telemedicine. Powell and Brantley (1990) suggested that when organizational knowledge is so decentralized and distributed, and achieves a competitive advantage, the core of innovation is found in organizational relationships. In such cases, learning occurs in the replication between firms, universities, research and development departments on one hand, and also suppliers and customers on the other hand (Cohen and Levinthal, 1989). Learning network can increase the absorption capacity and ability for the utilization of new knowledge in the firm (Grundmann, 2001). Grundman argued that learning networks provide learning benefits because they have access to greater and several search routines and also convey richer and more complex information (Powell, 1996). This concept highlights the potentials of telemedicine as a learning system in knowledge sharing and creation. For telemedicine to provide its potential benefits it is important to be managed to provide learning in the organization as we face the exchange information across the levels of the organization. In this paper we emphasize medical knowledge and collaboration in organizational learning. These two concepts are generated by two specific processes through telemedical network. The first one is related to healthcare teams that use telemedical

networks to enhance the acquisition, exchange, transfer and sharing of specific medical knowledge, while the second process is related to their learning to become adopted in collaboration with other teams and parties (Gao, 2008). Via telemedical network, these two processes reinforce each other because medical knowledge can be facilitated by telemedical collaborative knowledge, and learning about telemedicine collaborative knowledge must be implemented in the process of acquiring, transferring and sharing medical knowledge.

Knowledge management

Knowledge management has a complex meaning which is much more than knowledge and management alone. In various topics and disciplines with different contents, authors talk about knowledge management, so there are so many theories that discuss knowledge management from different dimensions and concepts. Moshtari and Peyvandi (2010) divided these theories in two categories: hard and soft tracks. Hard track theories and approaches are related to hard technologies such as applications with industrial and commercial objectives or industrial research and development, while soft track is related to software, databases, information, patent or copyright. In order to associate with hard track group, knowledge management levels that are essential to discuss is technology, research and development or innovative product and services, data mining, knowledge discovery from databases, management information system (MIS), information technology (IT) infrastructure, expert system, decision support system (DSS) (Moshtari and Peyvandi, 2010). These activities support the management of exciting, explicit knowledge. The foundation of this approach is shown in following process: fundamental assumption in the foregoing process is based on the confidence that wisdom comes from knowledge, knowledge comes from information, information comes from data and data comes from events as shown in Figure 1. Knowledge management therefore implies generating information from data via IT infrastructure which turns the knowledge into profitable industrial commodities. Thus, it is easy to find that IT investment can increase the long term profit of a firm and this may be a powerful driver for linking IT and knowledge management (KM). In hard track, KM is equal to information technology orientation. Another assumption states that IT can accelerate knowledge flow and suggests that firms should save this knowledge for supporting knowledge sharing.

Theories, approaches and applications that are related to soft track are represented by Nonaka; Takeuchi, Sveiby and Wenger 1997, 1998 focus on facilitating knowledge creation like:

- (a) Ba (shared space)
- (b) Community of practice

(c) Knowledge creation and sharing culture

Located in second level of priority, these theoretical approaches focus on tacit and implicit knowledge or Know-how. In addition, the consideration of this part of knowledge iceberg is very close to human resource tools such as body and mind. Nonaka (1994) noted:

“Knowledge is a dynamic human process of justifying personal belief toward the truth”.

There is one important thing: knowledge is something different from information and knowledge creation, and its aim is a complicated process that works on people's culture and social interaction. Some KM specialists believe that creating new knowledge is not only the revising and reuse of the existing knowledge in organization, but is also the making of a paradigm, representing a new scope or a new approach and also subordinate of knowledge creation. There are so many literatures on the role of IT infrastructure on knowledge sharing and knowledge management, that authors explain the role of IT infrastructure as being critical in knowledge management system (KMS) implementation.

Case of research

Company's background

The Petroleum Industry Health Organization (PIHO) established in 1914 in the name, Iran-British Oil Company in Abadan, Iran, bears the responsibility of providing healthcare and medical services for petroleum industry employees and their families. PIHO has 800 000 people that have to depend on them for healthcare, medical services, occupational medicine, etc. This population is more than 1% of Iran's population which contains petroleum members' families and local population that are located in rural areas where the government and ministry of health cannot serve them because petroleum utilities are sometimes located in distant areas. For example, one of these oil extracting complexes is located 20 km from access road, so it is very difficult for the ministry of health to serve them; therefore PIHO accepted this social responsibility to provide them healthcare and medical services. This population is half of PIHO's customers.

After establishing PIHO in 1914, the first PIHO's hospital was founded in Masjed Soleyman (first oil chamber in the Middle East) with 314 beds to serve people. At that time most of the patients of PIHO had special healthcare needs but the focus of medical activities was very narrow. So the patients that needed to receive medical services only received medical services through the provision of stability for the patients' illness in Masjed Soleyman hospital, after which they are

transferred to UK hospitals to receive medical services as health tourists. These days PIHO provides some complicated medical and healthcare services which show that PIHO has improved in human resource management to absorb top employees all over the country. Based on the foregoing facts, PIHO is unique in some areas and services in Iran and probably in other Middle East regions. Now, UK hospitals are closed and all procedures are executed in 271 centers in 20 zones in Iran.

In 1950, PIHO became the subordinate of the National Iranian Oil Company (NIOC) with the mission of providing healthcare and medical services for petroleum families, thus, becoming the first choice of petroleum members' families for healthcare services. PIHO has had 97 years experience in providing healthcare and medical services and during these years, human resource and employees' commitments were very inflexible, and the role of human resource was emphasized.

Today, PIHO has been divided between Iranian oil and gas field such that petroleum members' families now work and live in 20 zones where local healthcare policies are applied by each zone's healthcare zone administration. Each zone designs programs to upgrade the level of services. These 20 zones compete with each other to achieve higher performance. Table 1 shows the number of health and medical centers.

Telemedicine in PIHO

PIHO aiming at providing healthcare services for petroleum members' families executed telemedicine project in 2005 and now PIHO has 15 medical centers that utilize telemedical equipment in Iran out of 271. Network and telecommunication infrastructure for this projects are provided by a pipeline and telecommunication company. The paper tried to report the amount of knowledge sharing that occurred in telemedical services via this system from 2005 to 2011. These services utilize high technology medical equipments that support network protocols, and centers can use the high quality and top speed of this communication for face to face visits and provide services via high-tech equipment. Some of these equipment and their percentage of usage are shown in Table 2 while the list of specialties that used through telemedicine are shown in Table 3. This statistics is extracted from the frequency of use.

Frequency of visit

The frequency of visits between 2005 and 2011 was less than 1,600 and the most frequently used equipment was Orthopedic and internal medicine; more than 50% visits, and medical advice given via telemedicine were related to these specialist consultants.

In this study also, the frequency of diseases was

Table 1. List of subordinates of PIHO.

Centers	Quantity
Zone health care administration	20
Hospitals	9
Policlinics	20
Day clinics	20
Family clinics	67
Occupational clinics	73
Health centers	62
Total	271

Table 2. List of Tele-equipments and percentage of use from 2005 to 2010.

Equipment	Percentage of use
Tele-statuscope (support TCP/IP)	17
Tele-ECG (12 channels that support TCP/IP)	18
Tele-biologic diagnosis equipments (Glocometer)	3
Tele-otoscope	20
Tele-radiology	5
Visit cameras	20
Video conference facilities	100
Tele-sonography	3
Tele-surgery	3
Tele-spirograph	2

significance. In this case these medical conditions were divided into three levels. The first level included some diseases with high significance and in some cases with emergency priorities the level of significance among these three is depicted in Figure 2. The second level was related to medium priority while the third group included some conditions with low significance. From this analysis, the following statistics were found: in other views, the results showed that in 62% of consultations, specialists gave orders for the medical procedure to resident physicians or nurses and in 20% of consultations, specialists called for other specialist consultations.

Knowledge sharing via telemedicine

PIHO has a referral health system for providing services to patients. In this system, a triage nurse tells all the medical and health centers that the patient has visited to provide a history including time of admission and any evidence that physicians and specialists may need to know before beginning a medical procedure. Then this information is read by physicians who refer the patient to a specialist afterwards. Totally, health providing process can be showed in following steps: As shown in Figure 3, we observe two arrows for information and knowledge flow: on one hand, there is information flow from down to

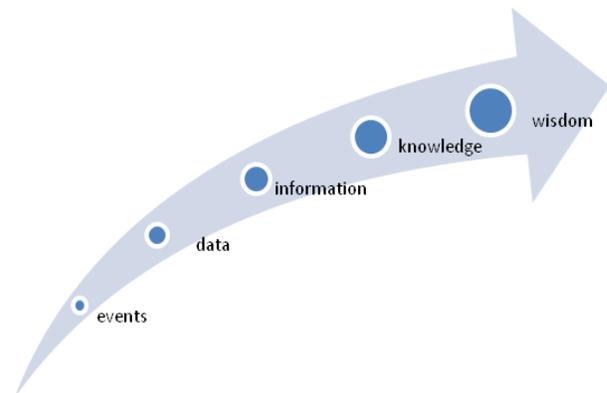


Figure 1. Data, information, knowledge and wisdom framework (Paul E. Bierly III et al., 2000).

up and on the other hand, there is knowledge flow from up to down for providing medical services for patients.

Framework

Here, the paper examines the impact of using telemedicine on knowledge sharing and organizational learning. In order to do this, the framework is supported by

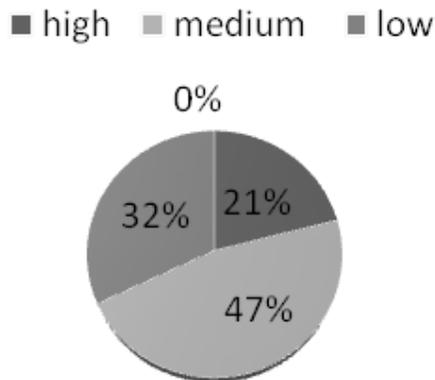


Figure 2. Level of significance tele-consultancy (PIHO, 2010).

questionnaires that are filled by telemedical operators in all the levels that was earlier mentioned.

It is obvious that using telemedicine can affect the quality of services in distant areas and also improve the availability of healthcare delivery in non-accessible and operational zones. This can facilitate the achievement of competitive advantage in these areas, but this research examines the extent of the usage of telemedicine.

Data analysis

In the data analysis, most of the PIHO telemedical users were selected. They were 37 in number. This number of users was distributed among all the health referral system that was earlier mentioned and was divided into the four levels that are shown in Table 4. In Table 4, the distribution of sample I: several dimensions such as age, level of referral system and gender, can be observed. As shown in the table, the respondents that participated were 37. They were asked 10 questions and their responses are shown subsequently. From the 37 responses, 94.5% was from males while the rest was from females. The age of users ranged from 20 to 55 years. With the different level of education in medical and nursing sciences and the different level of experience in health information technology, only 5% of users were sub-specialists, 13% of users were specialists, more than 40% were medical doctors and 40% were nurses. These data are available in Table 4.

This research focused on 10 questions that show knowledge sharing and organizational learning. These are two hypotheses that the paper answered: using telemedicine has positive impact on knowledge sharing and organizational learning in healthcare organizations. The questions that respondents were asked in the first section were about how often they shared user-experience via telemedicine and also how they shared telemedical user-knowledge to help others or resolve a problem via telemedicine. In the second section, the

questions were asked with reference to rate of usage of telemedicine for solving patients' problems and how easily information can be accessed via telemedicine. In the third section, the questions asked were related to productivity and how telemedicine can improve productivity. The questions in the fourth section were related to some cultural issues including knowledge sharing, idea sharing and suitability key learning of telemedicine. Finally, questions were asked with reference to training facilities and efficiency of training in knowledge sharing via telemedicine. The answers of the respondents are provided in Table 5.

DISCUSSION

This paper tried to introduce a conceptual framework and gathered some data to prove and show how the implementation of telemedicine can play significant roles in the quality and quantity of services, and also in achieving competitive advantage. The paper also explained that how knowledge can transfer from all levels of health network. It can be a referral system as is the case of PIHO. The paper also found out that one telemedical system can make a paradigm in healthcare organizations like knowledge oriented organizations. According to the results, majority of the respondents believe that most times, knowledge sharing via telemedicine is helpful. About 67% of the respondents strongly agreed and more than 25% believed that often, telemedicine facilitates knowledge sharing and is helpful to other users and healthcare staff. In addition, more than 75% agreed that telemedicine can solve some problems via knowledge sharing and can assist personnel. However, there were some difficulties that were encountered by the respondents in locating information in this system. This shows that the training of human resources and telemedical users is important to solve this problem. Again, in designing software interfaces, effort should be made to design telemedical control panel and information accessibility in a more user-friendly style. The next step of this research was aimed at finding out whether telemedicine could improve productivity in healthcare organizations. The results showed that more than 50% of the respondents believed that to a large extent, telemedicine impacts productivity. Then the research focused on the organization's culture in organizational learning and knowledge sharing via telemedicine. In this case, responses showed that more than 70% of the respondents believed that the extent of organizational culture in knowledge sharing and idea sharing is between moderate to a large extent.

Finally, telemedicine has the potential of being an influence factor or key factor in achieving competitive advantage in the rural and distant areas where PIHO works. Health care organizations or other operational organizations that want to provide healthcare services

Table 3. List of specialties that used through Telemedicine from 2005 to 2010.

S/N	Specialty	Frequency	%
1	Neurosurgery	100	6.309148
2	Urology	145	9.148265
3	Surgery	65	4.100946
4	Orthopedics	340	21.4511
5	Pediatrics	105	6.624606
6	Internal medicine	500	31.54574
7	Heart and vascular	300	18.92744
8	Women	30	1.892744
	Total	1585	100

Table 4. Demographic data.

Gender	Number	%
Male	35	94.5
Female	2	5.4
Total	37	100

Age	Number	%
20 – 30	2	5.4
31 – 40	12	32.4
41 – 50	22	59.4
51 or older	1	2.7
Total	37	100

Levels of referral system	Number	%
Sub-specialist	2	5.4
Specialist	5	13.5
Medical doctor	15	40.5
Nurse	15	40.5
Total	37	100

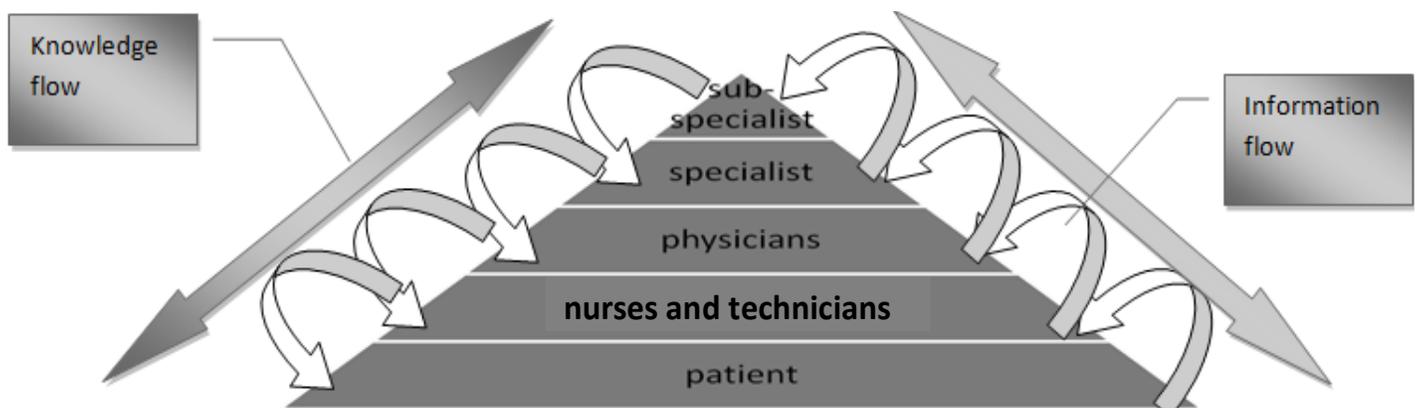


Figure 3. Information and knowledge flow through Telemedicine Referral levels in PIHO.

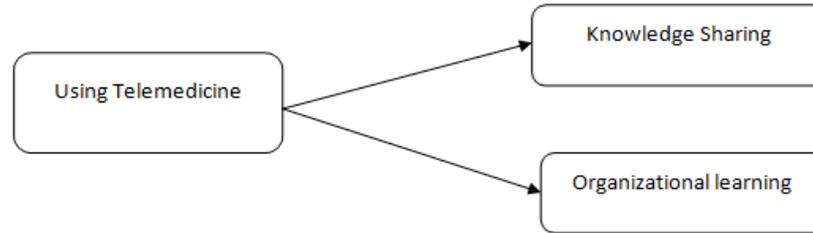


Figure 4. Framework.

Table 5. Survey results.

Knowledge sharing and organizational learning	Never	Seldom	Often	Always	Total
How often do you share your experience of knowing where to find information with other members via telemedicine?	0	7.2	25.8	67	100
How often do you share your experience of knowing whom to ask for help with other members of staff via the telemedicine?	Never 0	Seldom 5.4	Often 27.6	Always 67	Total 100
How often do you share your experience of knowing how to resolve a problem with other members of staff via the telemedicine?	Never 0	Seldom 0	Often 24.3	Always 75.7	Total 100
How frequently do you use telemedicine for patients?	Daily 73	Weekly 24.3	Monthly 2.7	Seldom 0	Total 100
How easily do you locate information via telemedicine?	Very easy 2.7	Easy 29.7	With some difficulty 51.3	Difficult 16.3	Total 100
To what extent does using the telemedicine help to improve your productivity?	To no extent 0	To a small extent 5.4	To a moderate extent 37.8	To a large extent 56.8	Total 100
To what extent does your organization have a culture of sharing ideas via telemedicine?	To no extent 2.7	To a small extent 13.5	To a moderate extent 78.4	To a large extent 5.4	Total 100
To what extent does your organization have a culture of sharing Knowledge via telemedicine?	To no extent 13.5	To a small extent 16.2	To a moderate extent 56.8	To a large extent 13.5	Total 100
How good is your organization at sharing key learning from telemedicine?	Poor 2.7	Mediocre 2.7	Good 56.8	Excellent 37.8	Total 100
Did you receive the right level of training to participate effectively in knowledge-sharing telemedicine?		Yes 73		No 27	Total 100

can use this solution to solve availability issues, organizational learning and especially, knowledge sharing. In healthcare organizations, because of the nature of work place, the existence of distance and the inability to meet physically, physicians, specialists and subspecialists must use other telemedical users that are located in the physical location of the patients. In a system of this nature, knowledge sharing has occurred and has formed a new paradigm in healthcare delivery by which healthcare organizations can deliver high quality services from developed areas to underdeveloped or less developed locations.

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